STRATEGY RESEARCH PROJECT

MILES WIDE, INCHES DEEP: ARMY LOGISTICS ON THE TWENTY FIRST CENTURY BATTLEFIELD

BY

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ABSTRACT

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The study begins with a futuristic vignette from a hypothetical Middle Eastern war early in the twenty-first century. In this future conflict the U.S. Army finds itself stranded on the battlefield and incapable of sustaining operations because of failures in strategic logistics planning in the late nineteenth century. Using the vignette to create a plausible failure of logistics, the author then critically examines the strategic thinking of senior leadership in regard to the current Revolution in Military Logistics (RML) in light of knowledge of the relationship between past Revolutions in Military Affairs (RMAs) and RMLs. From this perspective the author argues that planners in the 1990s did not recognize the true nature of the RML at the time and focused on technological enhancements to the old logistics paradigm, failing to foresee and develop the requisite doctrine, organizational structure, and new technologies necessary to support the on-going RMA.

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"There will not be a revolution in military affairs unless there is a revolution in logistics."

General Dennis Reimer
Army Chief of Staff
in testimony before the Senate
16 April 1997[1]

Stalemate at 48W32N

The year 2021 dawned on a hostile Iran, bent on controlling the entire geographic region surrounding the Arabian Sea. With shared beliefs in the fundamental superiority of the ways of Islamic life, Iran united with several of her neighbors. By 2018, Iran posed the most significant threat to world peace and economic prosperity since the Iraqi crisis of 1991. In response, the U.S. assembled an unprecedented coalition of European, South American, and Asian economic and military allies. Finally, after weeks of harried diplomatic activity and ignored economic threats, an Allied decision to preempt Iraqi intentions was made.

A massive, four-axis ground, sea, and air attack was simultaneously launched south from Turkey and the Caspian Sea, east from Egypt, north from the Arabian Sea, and from strategic strike bases in the United Kingdom, India, and the United States. Like swarms of bees, thousands of stealthy, stand-off, precision sea- and ground-based guided munitions sped toward critical nodes under Iranian control. Nearly invisible and highly automated "arsenal ships" crept close to the shoreline and fired hundreds of lethal weapons at strategic- and operational-level Iranian targets. Follow-on attacks by fast armored vehicles were launched within hours from nearby prepositioned fast surface ships.

The U.S. and her allies expected a fast-paced, nearly bloodless attack and subsequent victory similar to the success against Iraq nearly thirty years earlier, but in a much shorter span of time. American senior leadership, however, was perplexed when things almost immediately began to go wrong. A phenomenon of unknown origin, similar to an electromagnetic pulse, caused large numbers of "precision" weapons to miss their targets. Allied aircraft, ships, and armored forces became misoriented and were unable to report or coordinate their current positions or locate each other. Iran was able to erect protective electronic "corridors" that hid her major combat assets and shielded them from attack. "Brilliant" mines, able to loiter in an area until targets were identified and engaged, destroyed unknown numbers of Allied armored vehicles. Iranian "smart missiles" targeted supplies of fossil fuels, upon which a vast amount of Allied equipment still relied. Electronic interference interrupted satellite-based logistical asset reporting, requisitioning, and distribution systems. Intelligent, self-propagating Iranian computer viruses paralyzed data transfer channels at great distances, some in the U.S. domestic infrastructure itself. Determining who needed what, at what time, and at what location became nearly impossible. The American logistical system, upon which the Allied combatants relied, simply collapsed. With no way to supply or repair them, large numbers of ground-based combat systems were abandoned. Real-time requirements determination, distribution of available assets, and "focused logistics"[2] *were no longer achievable.*

The U.S.-led coalition obviously would not win quickly. Unable to resupply, reconstitute, or regenerate, U.S. forces faced a difficult choice: withdraw from the region immediately and return later to face an even better prepared enemy or continue to risk unacceptably high levels of materiel destruction and personnel casualties.

Iran had studied well the lessons of Iraq's experience in the Gulf War of 1991 and focused on the primary vulnerability of the much-touted American Revolution of Military Affairs (RMA) -- the relative inability to logistically support sustained, resource-intensive combat operations. In short, the American RMA failed to recognize the need for a concurrent Revolution in Military Logistics (RML) robust enough to support the dramatic increases in lethality and mobility allowed by technology, new doctrine, and new organizations. The Iranians foresaw that it would be extremely difficult to support and sustain a 21st-century Army beyond an initial pulse if that pulse failed to accomplish its objectives. In sum, America's RML had failed to account for the true implications of her RMA.

In the words of one senior U.S. planner at the time, "We shot our wad and failed to compel the enemy to do our will. Our support capabilities are truly spread thin -- miles wide and inches deep, as they used to say. Beyond a doubt, logistical supportability has determined the culminating point for our forces."

Introduction

The U.S. military failed in 2021 because senior leaders in the 1990s did not grasp the logistical implications of the 1990s Revolution in Military Affairs (RMA). In particular, the relationship between a true RMA and a corresponding Revolution in Military Logistics (RML) was not understood. A true RMA is characterized by fundamental and profoundly significant changes in the way in which warfare is waged. An RML always accompanies such an RMA and neither a true RMA nor its RML can be based solely on technological advancements. A true RMA has three very distinct, yet synergistic components -- doctrinal change, organizational change, and technological innovation. All three components have an effect on logistics systems. Technological change alone does not constitute an RMA (or its concomitant RML), nor do unrelated changes in military doctrine or organizations. A true RMA is the result of technological change combined with the effects of doctrinal and organizational change -- the net result is a fundamental difference in the way warfare is both conducted and supported.[3] Failure to understand the true nature of the 1990s RMA and its relationship with its requisite RML was

the genesis of the Army's logistical deficiencies in the twenty-first century.

Given an understanding of a true RMA, an RML is the realization of all aspects of support which enable military forces to engage in dramatically different ways of warfare. An RML is a major change in the nature and effectiveness of the support of military forces brought about by new technologies in combination with dramatic changes in logistics doctrine and organizational design. A true RML fundamentally alters the character of support and "enables" the conduct of military operations in the context of an RMA.

Significance of a True RMA

The U.S. Army of the 1990s was not the first army to undergo an RMA. Several examples of earlier RMAs exist: the development of the Macedonian phalanx and the implementation of the Roman legion are noteworthy.[4] A more thorough study of previous RMAs could have helped place the late twentieth century RMA and its RML in a proper context.

The modern era of warfare began with the Napoleonic RMA in which the vast resources of the newly industrializing nation were mobilized to equip and support a large conscripted army. The Napoleonic RMA was a true RMA and occurred in conjunction with three other related and equally important social upheavals: the political revolution that gave birth to democracy and the rise of the republican nation-state, the socioeconomic metamorphosis as a result of the Agricultural Revolution, and the major economic changes associated with the spread of the Industrial Revolution.[5] The significance of the Napoleonic RMA cannot be overstated. It represented not only just a better way to conquer a neighbor, but also the potential to seize an entire continent -- or in the military terms of the late twentieth century, the means to wage a theater-wide campaign. Napoleonic warfare's use of the corps organization and artillery, coupled

with the sheer size of the new *armeé en masse*, forced a corresponding RML in the years that followed. Logistics, defined as the art of moving and sustaining military forces, redefined itself in terms of this new RMA.

Between the Napoleonic RMA and the late 20th century, most historians agree there were four other lesser, yet significant, military revolutions.[6] The first of these encompassed the Crimean War, the American Civil War and the Franco-Prussian War and applied rail transit and the telegraph to extend command, control, and communications capabilities at the tactical, operational, and strategic levels. The second, the World War I era, incorporated mass production technologies to equip armies and navies of unprecedented size and provided the increased mechanization required for the logistical support of huge armies in the field. To this point the minor changes brought by these lesser RMAs can be described as attempts to capitalize on the Napoleonic RMA by solving the logistical problems posed by the *armeé en masse*. However, increased production and mechanization turned the operationally mobile warfare of the American Civil War/Franco-Prussian War into the static, attrition-style land combat of World War I.[7] The third of these post-Napoleonic developments was the military revolution in the inter-war period based on efficient internal combustion engines, tactical and strategic aircraft capabilities, and the radio. Together, these changes in the conduct of war reintroduced strategic and operational mobility, maneuver, and initiative. Again, this change resulted in the search for a new logistical evolution. Finally, some authors recognize a long-range strike RMA based on nuclear weapons and intercontinental precision strike capabilities.[8]

Except for the nuclear RMA, these lesser RMAs in the grand pattern represent attempts to find a proper balance between lethality (firepower) and mobility and logistical support following the Napoleonic RMA. The Napoleonic RML did not happen overnight! Indeed, approximately

100 years were required for logistical doctrine, organizational designs, and military technologies to evolve to the point that the Napoleonic RMA could be fully realized. The Napoleonic RML was *evolutionary* as opposed to *revolutionary*.

Senior U.S. strategic leaders failed to recognize that the RMA of the 1990s closely paralleled the Napoleonic RMA. Information technology and globalization facilitated political, social and economic changes equivalent to the grand changes that characterized the Napoleonic era. Taken together these changes required the questioning of the fundamental nature of contemporary warfare and the balance between lethality and mobility and logistics.

In contrast to the Napoleonic RMA, the 1990s RMA marked the closing of that era in warfare dominated by large military forces involved in huge operations. It became clear as early as the Gulf War of 1991 that the U.S. would have to be prepared to respond to threats from the agricultural, industrial, and informational levels of warfare with smaller, highly lethal, extremely mobile, and very expensive units. Introduction of these forces marked the U.S. entry into a period of military contraction and a return to wars fought for limited objectives by forces too precious to waste in mass, attrition-style warfare. This increased lethality and mobility required a focus on swift, decisive victories. However, the effects on logistics systems of the synergistic components of the RMA -- doctrine, organizations, and technology -- received scant attention. In short, U.S. planners did not fully recognize that a true RMA of Napoleonic proportions would require an equally significant RML. As in the Napoleonic era, a fundamental alteration in the underlying terms of reference for military forces -- lethality and mobility --would have dramatic implications for the scope, scale, and supportability of future conflicts.[9]

From a study of the Napoleonic RML, it was clear that an RML could be expected to lag behind the actual RMA by some period of time. This time period, however, can be compressed

with proper analysis and preparation. The objective of such efforts must be to bridge the differential between lethality/mobility and supportability as quickly as possible. For example, planners applied rail transit and the telegraph in the American Civil War/Franco-Prussian War period to logistically support the demands of the Napoleonic RMA. This approach, however, took 45 years to reach maturation. Senior logistics planners of the 1990s should have been capable of assessing the emerging supportability challenges brought about by the changing parameters of lethality and mobility and initiated efforts to minimize the RMA - RML time lag.

With the advent of a more globally interdependent world, the Army's senior leadership should have recognized the requirement to address the entire spectrum of conflict and military conflicts that could be anticipated in the twenty-first century. As one senior leader pointed out in 1997, "...it doesn't make any difference whether you're fighting a Class I or a Class II nation. They're going to have some degree of technology just as the comparatively primitive North Vietnamese forces had during the Vietnam War."[10] In other words, the U.S. required a military force capable of responding to agricultural, industrial, and information-age threats, along with any combination of the three. Technology would lead to the RMA, but its ramifications were significantly greater.

As a result of a flawed understanding of the extent of the RMA they were experiencing, the U.S. Army's senior leadership never came to grips with the logistics demands of the RMA. Faulty assumptions and fundamental errors in logistics planning were made, leading to the failure in the War of 2021. Primarily, U.S. logistical planners over-relied on technology and missed the fundamental change occurring in warfare. The Army mistakenly attempted to implement technological solutions for logistics challenges with little regard for doctrinal and organizational changes flowing from the RMA.

The RML Is Doctrine, Organizations and Technology

Like a true RMA, a true RML is a result of the synergistic effects of three primary elements: doctrinal change, organizational improvements and applications of technology. Each of these components is individually important, yet is substantially affected by changes in the other two. No component can be ignored or suboptimized at the expense of the others.

In light of this relationship, technology must be judiciously applied so that it complements logistical doctrinal and organizational changes. Too much focus was placed on the idea that the 1990s RML was primarily a technologically-driven phenomenon. Too much emphasis was placed on supporting forces capable of defeating heavy regional hegemonies like Iraq, rather than on identifying and preparing to address the true support challenges evolving from the implications of the RMA. These new challenges required inquiries into what types of logistical support would be required for smaller, more lethal, more mobile, and more expensive forces. The RML should have been better designed to support requirements generated by asymmetric competitors and increasingly diverse missions in view of an information-based, globalized world environment.[11] The existing evidence of the RMA suggested that the RML could not simply be a more clever or more elegant application of technology -- it would have a dramatic impact on logistics doctrine and organizations as well.

Changes in logistics doctrine could only have been determined based on a comprehensive analysis of the RMA. Since tactical and operational combat doctrine will substantially affect logistics doctrine and, consequently, logistics organizations, a thorough analysis of the RMA was required to determine how best to support the new RMA force. Since technology and doctrine actually do synergistically interact, the design of logistics organizations should have been a function of both.[12] The implications of the 1990s RMA, however, were not fully understood at

the time and senior planners failed to fully grasp the impact of changing doctrine and new technology on the organizational design of logistics units. The absence of this understanding led to premature organizational changes and technological applications of questionable benefit.[13] Change in logistics doctrine, propelled by technological innovation, should guide logistical force development.

Senior logisticians in the 1990s started from a faulty view of future logistics doctrine. The future Army was envisaged to be one similar to those of Ghengis Khan and Alexander the Great, wheeling freely about the battlefield virtually unconstrained by logistical support requirements. This view led to gross errors in logistical force development. The focus was primarily on determining supporting structures for a small, mobile Force XXI-type Army. Assuming that technology would allow small logistics units to deliver precisely tailored sustainment to units exactly when needed, the Army's leadership reached a consensus that sustainment infrastructure and redundant, multi-layered, multi-echeloned material stockpiles at all levels could be eliminated. Advanced business applications in the areas of inventory control, transportation management, and distribution were expected to produce efficiencies that would greatly reduce logistics overhead. Concepts such as anticipatory logistics, split-based operations, Velocity Management, battlefield distribution, Total Asset Visibility, and Objective Supply Capability were collectively used as a rationale to decrease the logistics tail. These changes in logistics *doctrine*, flowed from a desire to capitalize on technology rather than on an analysis of the on-going RMA. The "RML" sought to shorten the logistical tail associated with the twentieth century military.

The logistical "tail" of the Army, however, would continue to be important. Anticipated technological innovations that would have allowed major reductions in materiel consumption

(such as food, fuel, and ammunition) and logistical infrastructure were simply not possible. In the prophetic words of one Force XXI officer in 1996: "Continuous support has not changed. Soldiers still have to eat, refuel and rearm..."[14] Despite this prophetic insight, sustainability and logistics force structure were surrendered based on the view that future conflicts would be very short and consume little. Technology was expected to solve the twentieth century logistics problem -- ten feet of "tail" for every "tooth."

Missteps and Missed Opportunities

The prevailing inability to understand the true nature of the RMA was the catalyst for a number of subsequent misjudgments by the Army's senior logisticians. Significantly, an RML for the 1990s RMA was never really evaluated. Army logistics planners sought to support the old paradigm as opposed to analyzing the new. They attempted to accomplish basically the same old functions in a faster, cheaper, and less manpower-intensive manner. This Total Quality Management (TQM) mentality, with its fixation on process, prevented true innovation and revolution. Logistics planners never fully explored what the new RMA would demand in the way of an RML, nor how to effectively minimize the RMA - RML time lag.

Without recognizing the true logistical implications of the RMA, logisticians became enamored with finding technological solutions to the challenges of moving and sustaining ground forces in the late 1990s. As a result, the Army squandered precious fiscal resources in searches for "silver bullet technologies" in attempts to resolve long-standing, but last RMA, support challenges. Again, this focus on improving functions that the Army already did fairly well allowed little opportunity for innovative, revolutionary change.

This emphasis on technology manifested itself as long ago as the late 1980s when the

Army began to predict huge materiel and personnel savings based primarily on existing and *anticipated* technologies. One example of this over-reliance on technology was the Army's experimental Task Force XXI (Force XXI) brigade combat team at Fort Hood, Texas, in 1997. Applauded as the Army's move to set the direction for future ground forces, the initiative added automation and digital communications equipment to the brigade's combat vehicles, allowing near-real-time horizontal and vertical tactical situational awareness among the combat force. Unfortunately, the same level of effort was not expended to link "supporters." This shortcoming, combined with the elimination of large numbers of "supporters" from the Division XXI force structure, created a force whose sustainability was never severely stressed by the canned exercises seeking primarily to test combat arms organizations and doctrine. Instead, long-range logistics planners found solace in proposed new technologies they believed would solve all problems.

Senior leaders used technology to predicate reductions in manpower and funding levels. In late 1996, then-Secretary of Defense William J. Perry stated: "The various things we're experimenting with, the various technologies and efficiencies we're introducing -- all, I think, are in the direction of driving the support tail down. Therefore, I think it should lead to a reduction in end strength."[15] Planners simply ignored the fact that many logistics missions are, by nature, manpower intensive. Missions which were recent in the minds of 1990s planners -- such as those fielded for Hurricanes Andrew and Iniki (1992); the L.A. Riots (1992); Migrant Operations in Cuba and Panama (1994); along with Operations Restore Hope in Somalia (1992-94), Sea Angel in Bangladesh (1991), Provide Comfort in Iraq (1991-?), Support Hope in Rwanda (1994), and the Virgin Islands (1995) -- were primarily logistics-based and did not demand high-technology solutions. Unfortunately, in the budget-conscious post-Cold War environment, imprudent

decisions were made to eliminate forces that could provide significant capabilities for such operations: deployable water purification teams, mortuary affairs units, transportation detachments, and many others were placed in the Reserve Components or deactivated. Secretary Perry's conclusion was contrary to the historical reality.

Technological innovations, alone, do not make an RMA and do not result in logistical savings. The noted author and military historian Martin Van Creveld pointed out in 1977 that the greater lethality and mobility of modern armies was effectively neutralized by increased logistical requirements. He challenged the assumption that improved supply and transportation systems -- logistics -- enhanced an army's mobility. From his study of history, Van Creveld concluded that lethality and mobility in modern armies are functions of responsive supply and transportation systems and that, paradoxically, in relation to their capabilities, the lethality and mobility of modern armies were impaired by their own inherent consumption requirements. If lethality and mobility are theoretically neutralized by offsetting logistical requirements, what were the implications of the emerging RMA/RML in the 1990s? What did the U.S. Army not yet realize about the effects of the RMA/RML on its underlying assumptions about war? The applicability of Van Creveld's ideas on the U.S. Army's Force XXI and its "Army After Next" was never sufficiently explored in the rush for "savings."

Given what is now known about RMAs and RMLs and their relationship, the Army's senior leadership in the 1990s could have established a better azimuth for the RML and reduced the RMA - RML time lag. Senior leaders at the time should have understood certain fundamentals and initiated relevant actions. The first important concept was the idea that an RML has doctrinal, organizational and technological components. Each is inextricably interconnected with the others and emphasis on one component at the exclusion of the others

precludes the true RML. For example, it was unwise to eliminate logistics force structure supporting a functional, high-tech force (an organizational change) before the technological enhancements were adequately developed and impact on doctrine ascertained. Senior leaders should have recognized that an increase in the Army's lethality and mobility could well be limited by logistical requirements and that improved logistics systems in and of themselves would not necessarily enhance either, as Van Creveld had pointed out years earlier. Finally, they should have recognized that any significant change in one component of an RMA would result in significant, unanticipated changes in the others.

Logistics planners in the 1990's were correct when they determined that all future operational-level deployments of American forces would be in conjunction with other services and the militaries of other countries -- joint and coalition warfare. Yet these same planners failed to recognize the full implications for the RML. As had been the case in the earlier Gulf War and several previous and subsequent interventions by the United Nations, the United States Army, as the premier logistical power of the century, increasingly assumed the logistical support role for other services and coalition partners. While this eliminated redundant capabilities in other services and allowed coalition partners to focus on providing combat forces, it demanded a revolutionary change in U.S. logistics doctrine and organizational structure.

Globalization also led to a multitude of Army roles within the RMA. The diverse challenges of the twenty-first century demanded hi-tech Force XXI-type forces to counter similar forces from peer competitors or open aggressors; forces capable of combat operations in conjunction with other services and other countries for internal stability; and forces for humanitarian, disaster relief and other non-combat operations. The desire for political stability and the demands of the integrated global economy combined with CNN film footage of pain and

suffering beamed into the average American dining room were guaranteed to force greater worldwide involvement. This increasing demand on Army logistics severely taxed existing organizations, proved the inadequacy of logistics doctrine, and raised new organizational issues at the turn of the century, but these were never evaluated. Instead, retention of logistics force structure to perform these missions was deemed unaffordable by the senior political and military leadership.

Given the technological and material superiority of the U.S. and her allies, senior leaders in the 1990s should have foreseen an asymmetric response like the one executed by the Iranians in 2021. The Army of the late 1990s, however, had a different view of its potential future adversaries and seemed fixated on fighting and supporting the last war again. Even with full informational dominance, the "digitized" U.S. force that was developed was a questionable match for one, like the Iranians, that could be expected to take full advantage of asymmetric avenues of approach. Few plans were made for asymmetric enemy attacks against U.S. strengths using countervailing technologies in areas such as information operations, biological weapons, terrorism, or long-range precision munitions. While these asymmetric threats were difficult to define, difficult to plan for, and even more difficult to secure funding to develop defenses, what remained unclear was whether or not a Force XXI-type organization and its support forces would even remain relevant for such an environment. If new, different, or additional forces were to be designed to counter emerging asymmetric threats, the support and sustainment challenges would have been substantial. The implication of these challenges, however, remained unresearched because Army logisticians remained focused on the last RMA.

Perhaps the greatest oversight was the failure to recognize that with the information explosion and globalization of the 1990s came a number of new vulnerabilities. The *asymmetric*

threat to U.S. warfighting capability posed by a U.S. logistics infrastructure totally reliant on computer-based commercial technology was never really identified. Successful exploitation of this vulnerability restricted U.S. ability to conduct sustained operations of any type. As a result, reliable Army logistics support became more tenuous than ever before, but the need for redundancy was never explored in the budget-conscious era following the end of the Cold War.

Senior Army planners should have concluded that an RMA based on information technology would lead not only to greater accuracy of weaponry, but also to a greater number of engagements. The information explosion of the RMA facilitated the development of digital communications technologies and ever-cheaper computers that linked operators together in systems. Ultimately systems were linked to other systems, allowing virtually instantaneous transmission of vast amounts of information to any recipient with the appropriate receiver. The use of satellites with total global coverage, combined with ever-increasing data transfer rates brought significant precision to an otherwise "imperfect knowledge of the situation."[16] These vast improvements in information operations, however, led to another manifestation of "information overload." Just as the U.S. Army's Military Intelligence community had discovered in the 1980s, a plethora of unrefined information did not necessarily lead to better intelligence data. In this case, warfighters learned it did not necessarily lead to better identification, analysis, and prioritization of targets.

As Van Creveld had pointed out, the lethality and mobility of modern armies could be impaired by their own inherent consumption requirements and improved logistics systems would not necessarily enhance an army's performance. The unprecedented ability to quickly relay information, combined with Van Creveld's ideas, had remarkable implications for commanders with an unprecedented ability to disperse their weapons yet mass their fires. Instantaneous

knowledge allowed senior commanders to order strikes against targets within seconds of identification. The operating rule for warfighters became: if targets could be sensed they would be engaged.

With this degree of situational awareness and an unparalleled ability to identify and engage targets, it was unreasonable for logistical planners to assume that expenditure rates for complex, high-tech munitions would be less than prior to the RMA. For the past 200 years, improvements in targeting and delivery systems have led to increased consumption rates for munitions. While gross consumption in the RMA may decline simply because there are fewer systems on the battlefield, expenditure rates per system will rise, directly correlated to an improved ability to acquire targets. Indeed, a futuristic war game conducted by the U.S. Army War College in 1997 concluded that if a target could be *sensed*, it would be targeted -- the more the Army could *sense*, the more it would *shoot*. With this unprecedented ability to *sense* and *shoot*, Van Creveld's conclusion that the U.S. Army's lethality and mobility would be hampered by its own inherent consumption requirements becomes clear.

Planners of the 1990s focused on short, highly mobile, symmetric conflicts and predicted reduced rates of consumption in several key commodity areas such as food, fuel, and ammunition. In doing this, they ignored Clausewitz's admonishment to be aware of the "fog" and "friction" of war. Senior logistics planners believed that the fog and friction in logistics could be overcome by the ability of information technology to anticipate requirements and effortlessly deliver on time. But as Clausewitz's theory suggests, fog and friction are constants.

The increasing complexity of the Army's weapons systems and its technological logistical infrastructure, however, only exacerbated the potential for fog and friction. Significant changes in how and with what the Army would fight came with constantly escalating

complexity. Even with the application of more efficient acquisition, transportation, and distribution management systems, the logistics manager's vulnerability to unforeseen circumstances continued. Premature decisions to reduce the Army's logistical infrastructure without determining the resultant impact on the doctrinal and technological elements of the RML added to the friction as commanders became dependent on "just-in-time" logistics in very unpredictable environments. The fact that few of the concepts designed to reduce logistics overhead had been tested or studied to any great degree under significant operational stress before they were adopted contributed to the Army's failure to identify their shortcomings until 2021. Acceptance that fog and friction can never be completely overcome required the design of logistics doctrine and organizations sufficiently robust to negate the effects.

Summary

> **History alone will judge what it means to have a revolution in military affairs. The uncertainties that have always surrounded warfare have a profound effect on the military profession, inclining it to conservatism, and setting evolution as the normal upper limit of the rate of change. That characteristic is likely to remain central to the profession.**[17]

The U.S. Army's strategic leadership and its senior logistics planners failed to comprehend the magnitude and complexity of the 1990s RMA and its attendant RML. They missed the obvious parallels with the Napoleonic RMA/RML -- both RMAs occurred in the context of massive social, organizational, and institutional change and resulted in vast changes in warfare as lethality, mobility, and logistical support sought a new balance in a radically changed world. The information revolution and globalization of the late twentieth century foretold change of the same order of magnitude as the Napoleonic RMA and should have led to the

realization that technology alone would lead neither to a true RMA nor to an RML. Rather, technology must be combined with appropriate organizational and doctrinal changes for effective logistics support within a new coherent operational framework. Failure to comprehend this synergism led to an RML ill suited to support the RMA.

In failing to make the proper connection between the true RMA and the RML, the Army's leadership failed to see the need for a revolutionary evaluation of logistics doctrine, organizations, and technologies. As a result, the Army's leadership avoided tough decisions in regard to resource allocations and manpower levels and accepted the logistics community's assumption that the old paradigm would still be relevant. Consequently, senior Army leaders and logistics planners focused on technological enhancements to the old logistics paradigm and failed to foresee and develop the requisite doctrinal, organizational structure, and new technologies necessary to support the on-going RMA.

Conservatism, that is the inability, to take a true look at the future until it has arrived, has historically characterized most military leadership in RMAs. An Army of the twenty-first century does not have the luxury of waiting 100-plus years for an RMA to come to fruition. Successful armies of the future must ensure that the RMA and the RML are experienced nearly simultaneously and are closely synchronized. The information necessary to determine the nature of the RML to support the RMA is available -- it awaits proper analysis and the advocacy of the Army logistics community.

ENDNOTES

[1]Army Times, 28 April 1997, 29.

[2]Department of the Army, Army Vision 2010 (Washington: U.S. Department of the Army, 1996), 15.

[3]Jeffrey R. Cooper, Another View of the RMA (Carlisle Barracks, PA: U.S. Army War College Strategic Studies Institute, 1994), 13.

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[5]Ibid., 14.

[6]Ibid.

[7]Ibid.

[8]Ibid., 15.

[9]Ibid.

[10]George C. Wilson, "Sheehan: The Military As He Sees It," Army Times, 7 April 1997, 11.

[11]Cooper, V.

[12]Raoul H. Alcala, "Guiding Principles for Revolution, Evolution, and Continuity in Military Affairs," in Whither the RMA: Two Perspectives on Tomorrow's Army by Paul J. Bracken and Raoul H. Alcala (Carlisle Barracks: U.S. Army War College, Strategic Studies Institute, 1994), 32.

[13]Ibid.

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[15]Patrick Pexton, "Two-war Strategy Here To Stay," Army Times, 6 January 97, 12.

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[17]Alcala, 42.

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